

What is claimed is:

1. A method for electroplating a metal on a substrate, comprising the steps of:

(a) sequentially applying two or more cycles comprising an electrodeposition pulse followed by an electrodisolution pulse to the substrate, wherein each electrodeposition pulse has a time duration, and wherein the time duration of each electrodeposition pulse of subsequently applied cycles remains the same or is reduced.

2. The method of claim 1 wherein a time interval of zero electrical pulse separates each cycle.

3. The method of claim 2 wherein the time interval of zero electrical pulse is between about 1 millisecond and about 500 milliseconds.

4. The method of claim 1 wherein each electrodeposition pulse has an amplitude between about 0.5 amperes and about 10 amperes.

5. The method of claim 1 wherein each electrodeposition pulse has a time duration between about 500 millisecond and about 3000 milliseconds.

6. The method of claim 1 wherein each electrodisolution pulse has an amplitude between about 3 amperes to about 60 amperes.

7. The method of claim 1 wherein the electrodisolution pulse has a time duration between about 1 millisecond to about 500 milliseconds.

8. The method of claim 1 wherein the time duration of electrodeposition pulse of subsequently applied cycles is reduced by about 5 milliseconds to about 50 milliseconds.

9. The method of claim 1 wherein step (a) is performed with the substrate in an electroplating bath comprising a chemical having a diffusion time constant about equal to the time interval of zero electrical pulse.

10. The method of claim 9 wherein the electroplating bath further comprises copper ions.

11. A method for electroplating a metal on a substrate having a trench, comprising the steps of:

(a) sequentially applying two or more cycles comprising an electrodeposition pulse followed by an electrodisolution pulse to the substrate, wherein each electrodeposition pulse has a time duration, and wherein the time duration of each electrodeposition pulse of subsequently applied cycles remains the same or is reduced; and

(b) applying a DC current to the substrate to deposit the metal to a desired thickness on the substrate.

12. The method of claim 11, further comprising the step of providing a time interval of zero electrical pulse separates each cycle.

13. The method of claim 12 wherein the time interval of zero electrical pulse is between about 1 millisecond and about 500 milliseconds.

14. The method of claim 11 wherein each electrodeposition pulse has an amplitude between about 0.5 amperes and about 10 amperes.

15. The method of claim 11 wherein each electrodeposition pulse has a time duration between about 500 millisecond and about 3000 milliseconds.

16. The method of claim 11 wherein each electrodisolution pulse has an amplitude between about 3 amperes to about 60 amperes.

17. The method of claim 11 wherein the electrodisolution pulse has a time duration between about 1 millisecond to about 500 milliseconds.

18. The method of claim 11 wherein the time duration of electrodeposition pulse of subsequently applied cycles is reduced by about 5 milliseconds to about 50 milliseconds.

19. The method of claim 11 wherein step (a) is performed with the substrate in an electroplating bath comprising a chemical having a diffusion time constant about equal to the time interval of zero electrical pulse.

20. The method of claim 19 wherein the electroplating bath further comprises copper ions.